In[1]:=
```
(* THE VERY BASIC (1) *)
5 / 6
3 + 4
9^2
E^(I Pi)
Pi
N[Pi]
```

Out[1]= $\frac{5}{6}$

Out[2]= 7

Out[3]= 81

Out[4]= -1

Out[5]= π

Out[6]= 3.14159

In[7]:=
```
(* THE VERY BASIC (2) *)
```

In[7]:=
```
3 + 4
% / 2
N[%]
10 * 10 == 100
10 < Exp[10]
10 < Log[10]
```

Out[7]= 7

Out[8]= $\frac{7}{2}$

Out[9]= 3.5

Out[10]= True

Out[11]= True

Out[12]= False

In[13]:=
```
(* THE VERY BASIC (3) *)
(x - 1) (x + 1)
Simplify[%]

(x + 1) (x + 2) (x + 3)
Expand[%]

x^10 - 1
Factor[%]
```

Out[13]= $(-1+x)(1+x)$

Out[14]= $-1+x^2$

Out[15]= $(1+x)(2+x)(3+x)$

Out[16]= $6+11\,x+6\,x^2+x^3$

Out[17]= $-1+x^{10}$

Out[18]= $(-1+x)(1+x)\left(1-x+x^2-x^3+x^4\right)\left(1+x+x^2+x^3+x^4\right)$

In[20]:=
```
(* DEFINITION *)
```

In[19]:=
```
a = 1
b = 2
a + b
a * b
y = Sin[x]
Plot[y, {x, -Pi, Pi}]
```

Out[19]= 1

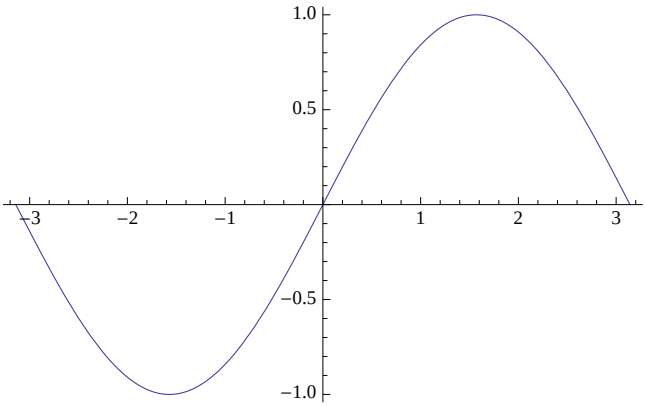
Out[20]= 2

Out[21]= 3

Out[22]= 2

Out[23]= Sin[x]

Out[24]=

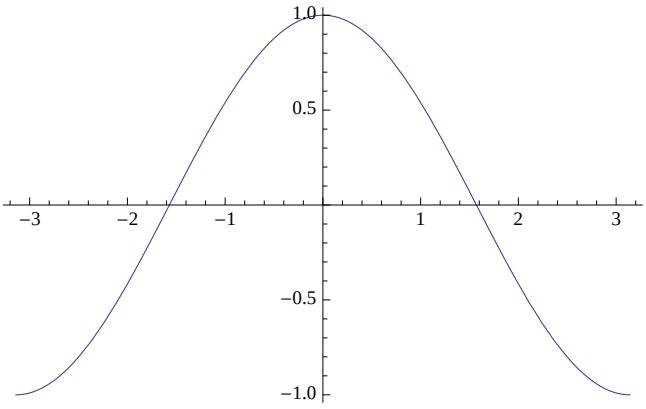


In[25]:=
```
(* In the last case, you should instead "define a function". *)
f[x_] := Cos[x]
f[Pi]
f[Pi / 2]
Plot[f[x], {x, -Pi, Pi}]
```

Out[26]= −1

Out[27]= 0

Out[28]=



In[29]:=
```
(* Substitution (VERY IMPORTANT!) *)
y = Sin[x] + Cos[x]
```

Out[29]=
```
Cos[x] + Sin[x]
```

In[30]:=
```
y /. {x → 4}
```

Out[30]=
```
Cos[4] + Sin[4]
```

In[31]:=
```
y /. Sin → Tan
```

Out[31]=
```
Cos[x] + Tan[x]
```

In[32]:=
```
y /. {Sin → Exp, x → 4}
```

Out[32]=
$$e^4 + \text{Cos}[4]$$

In[33]:=
```
ReplaceAll[y, x → 4]
```

Out[33]=
```
Cos[4] + Sin[4]
```

In[37]:=
```
(* REPEATED substitution *)
```

In[34]:=
```
energy = m * gamma
ReplaceAll[energy, {gamma → 1 / Sqrt[1 - beta^2], beta → v / c}]
```

General::spell1 :
スペル間違いの可能性があります．新規シンボル"gamma"はすでにあるシンボル"Gamma"に似ています． ≫

Out[34]=
```
gamma m
```

General::spell1 :
スペル間違いの可能性があります．新規シンボル"beta"はすでにあるシンボル"Beta"に似ています． ≫

Out[35]=
$$\frac{m}{\sqrt{1 - \text{beta}^2}}$$

In[36]:=
```
ReplaceRepeated[energy, {gamma → 1 / Sqrt[1 - beta^2], beta → v / c}]
```

Out[36]=
$$\frac{m}{\sqrt{1 - \frac{v^2}{c^2}}}$$

In[37]:=
```
(* Or *)
energy //. {gamma → 1 / Sqrt[1 - beta^2], beta → v / c}
```

Out[37]=
$$\frac{m}{\sqrt{1 - \frac{v^2}{c^2}}}$$

In[38]:=
```
(* EMERGENCY EXIT *)
(* ALT(or command)+period if you want to stop evaluation. *)
Integrate[(Sin[x] + Tan[x])^100, x]
(* You can stop evaluation from the menu: Evaluation>Abort Evaluation. *)
```

Out[38]=
```
$Aborted
```

In[39]:=
```
(* This is important when you induce an infinite-evaluation. *)
Sin[x] /. x → Sin[x]
Sin[x] //. x → Sin[x]
```

Out[39]=
```
Sin[Sin[x]]
```

Out[40]=
```
$Aborted
```

```
(* THAT'S MATHEMATICA BASIC. *)
(* Now Let's forget all == ABORT THE KERNEL. *)
```

In[41]:=
```
energy
```

Out[41]=
```
gamma m
```

In[42]:=
```
Exit[]
(* Now the kernel has been initialized. *)
```

In[1]:=
```
energy
(* is now undefined. *)
```

Out[1]=
```
energy
```